

## PROPOSED TITLE 24 UPDATED EFFICIENCY REQUIREMENTS

*TABLE 110.2-A ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS –  
MINIMUM EFFICIENCY REQUIREMENTS*

Equipment Type	Size Category	Efficiency <sup>a</sup>	Test Procedure <sup>c</sup>
Air conditioners, air cooled both split system and single package	≥ 760,000 Btu/h	9.7 EER <sup>b</sup> <u>11.2 IEER<sup>b</sup></u>	ANSI/AHRI 340/360
Air conditioners, water cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	12.1 EER <sup>b</sup> <u>13.9 IEER<sup>b</sup></u>	ANSI/AHRI 340/360
	≥135,000 Btu/h and < 240,000 Btu/h	12.5 EER <sup>b</sup> <u>13.9 IEER<sup>b</sup></u>	ANSI/AHRI 340/360
	≥240,000 Btu/h and < 760,000 Btu/h	12.4 EER <sup>b</sup> <u>13.6 IEER<sup>b</sup></u>	ANSI/AHRI 340/360
	≥ 760,000 Btu/h	12.2 EER <sup>b</sup> <u>13.5 IEER<sup>b</sup></u>	ANSI/AHRI 340/360
Air conditioners, evaporatively cooled	≥65,000 Btu/h and < 135,000 Btu/h	12.1 EER <sup>b</sup> 12.3 IEER <sup>b</sup>	ANSI/AHRI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	12.0 EER <sup>b</sup> 12.2 IEER <sup>b</sup>	ANSI/AHRI 340/360
	≥240,000 Btu/h and < 760,000 Btu/h	11.9 EER <sup>b</sup> 12.1 IEER <sup>b</sup>	ANSI/AHRI 340/360
	≥ 760,000 Btu/h	11.7 EER <sup>b</sup> 11.9 IEER <sup>b</sup>	ANSI/AHRI 340/360
Condensing units, air cooled	≥ 135,000 Btu/h	10.5 EER 11.8 IEER	ANSI/AHRI 365
Condensing units, water cooled	≥ 135,000 Btu/h	13.5 EER 14.0 IEER	
Condensing units, evaporatively cooled	≥ 135,000 Btu/h	13.5 EER 14.0 IEER	
<sup>a</sup> IEERs are only applicable to equipment with capacity control as per ANSI/AHRI 340/360 test procedures <sup>b</sup> Deduct 0.2 from the required EERs and IEERs for units with a heating section other than electric resistance heat. <sup>c</sup> Applicable test procedure and reference year are provided under the definitions.			

**TABLE 110.2-B UNITARY AND APPLIED HEAT PUMPS, MINIMUM EFFICIENCY REQUIREMENTS**

<b>Equipment Type</b>	<b>Size Category</b>	<b>Subcategory or Rating Condition</b>	<b>Efficiency <sup>a</sup></b>	<b>Test Procedure<sup>c</sup></b>
Air Cooled (Cooling Mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	Split system and single package	11.0 EER <sup>b</sup> 11.2 IEER <sup>b</sup>	ANSI/AHRI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h		10.6 EER <sup>b</sup> 10.7 IEER <sup>b</sup>	
	≥ 240,000 Btu/h		9.5 EER <sup>b</sup> 9.6 IEER <sup>b</sup>	
Water source (cooling mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	86°F entering water	<u>13.0 EER</u>	ISO-13256-1
<u>Water source (cooling mode)</u>	<u>≥ 135,000 Btu/h and &lt; 240,000 Btu/h</u>	<u>86°F entering water</u>	<u>13.0 EER</u>	
Groundwater source (cooling mode)	< 135,000 Btu/h	59°F entering water	<u>18.0 EER</u>	ISO-13256-1
Ground source (cooling mode)	< 135,000 Btu/h	77°F entering water	<u>14.1 EER</u>	ISO-13256-1
Water source water-to-water (cooling mode)	< 135,000 Btu/h	86°F entering water	10.6 EER	ISO-13256-2
Groundwater source water-to-water (cooling mode)	< 135,000 Btu/h	59°F entering water	16.3 EER	ISO-13256-1
Ground source brine-to-water (cooling mode)	< 135,000 Btu/h	77°F entering water	12.1 EER	ISO-13256-2
Air Cooled (Heating Mode) Split system and single package	≥ 65,000 Btu/h and < 135,000 Btu/h (cooling capacity)	47° F db/43° F wb outdoor air	3.3 COP	ANSI/AHRI 340/360
		17° F db/15° F wb outdoor air	2.25 COP	
	≥ 135,000 Btu/h (cooling capacity)	47° F db/43° F wb outdoor air	3.2 COP	
		17° F db/15° F wb outdoor air	2.05 COP	

Equipment Type	Size Category	Subcategory or Rating Condition	Efficiency <sup>a</sup>	Test Procedure <sup>c</sup>
Water source (heating mode)	< 135,000 Btu/h (cooling capacity)	68°F entering water	<u>4.3 COP</u>	ISO-13256-1
<u>Water source (heating mode)</u>	<u>≥ 135,000 Btu/h and &lt; 240,000 Btu/h (cooling capacity)</u>	<u>68°F entering water</u>	<u>2.9 COP</u>	<u>ISO-13256-1</u>
Groundwater source (heating mode)	< 135,000 Btu/h (cooling capacity)	50°F entering water	<u>3.7 COP</u>	ISO-13256-1
Ground source (heating mode)	< 135,000 Btu/h (cooling capacity)	32°F entering water	<u>3.2 COP</u>	ISO-13256-1
Water source water-to-water (heating mode)	< 135,000 Btu/h (cooling capacity)	68°F entering water	3.7 COP	ISO-13256-2
Groundwater source water-to-water (heating mode)	< 135,000 Btu/h (cooling capacity)	50°F entering water	3.1 COP	ISO-13256-2
Ground source brine-to-water (heating mode)	< 135,000 Btu/h (cooling capacity)	32°F entering water	2.5 COP	ISO-13256-2
<p><sup>a</sup> IEERs are only applicable to equipment with capacity control as per ANSI/AHRI 340/360 test procedures.</p> <p><sup>b</sup> Deduct 0.2 from the required EERs and IEERs for units with a heating section other than electric resistance heat.</p> <p><sup>c</sup> Applicable test procedure and reference year are provided under the definitions.</p>				

TABLE 110.2-C AIR-COOLED GAS-ENGINE HEAT PUMPS

Equipment Type	Size Category	Subcategory or Rating Condition	Efficiency	Test Procedure <sup>a</sup>
Air-Cooled Gas-Engine Heat Pump (Cooling Mode)	All Capacities	95° F db Outdoor Air	0.60 COP	ANSI Z21.40.4A
Air-Cooled Gas-Engine Heat Pump (Heating Mode)	All Capacities	47° F db/43° F wb Outdoor Air	0.72 COP	ANSI Z21.40.4A
<p><sup>a</sup> Applicable test procedure and reference year are provided under the definitions.</p>				

TABLE 110.2-D WATER CHILLING PACKAGES – MINIMUM EFFICIENCY REQUIREMENTS <sup>a,b</sup>

Equipment Type	Size Category	Path A Efficiency <sup>a,b</sup>	Path B Efficiency <sup>a,b</sup>	Test Procedure <sup>c</sup>
Air Cooled, With Condenser Electrically Operated	< 150 Tons	<u>&gt; 10.100 EER</u> <u>≥ 13.700 IPLV</u>	<u>&gt; 9.700 EER</u> <u>≥ 15.800 IPLV</u>	AHRI 550/590
	≥ 150 Tons	<u>&gt; 10.100 EER</u> <u>≥ 14.000 IPLV</u>	<u>&gt; 9.700 EER</u> <u>≥ 16.100 IPLV</u>	
Air Cooled, Without Condenser Electrically Operated	All Capacities	Air-cooled chillers without condensers must be rated with matching condensers and comply with the air-cooled chiller efficiency requirements.		
Water Cooled, Electrically Operated, Reciprocating  (Reciprocating)	All Capacities	Reciprocating units must comply with the water-cooled positive displacement efficiency requirements.		AHRI 550/590
Water Cooled, Electrically Operated Positive Displacement	< 75 Tons	<u>≤ 0.750 kW/ton</u> <u>≤ 0.600 IPLV</u>	<u>≤ 0.780 kW/ton</u> <u>≤ 0.500 IPLV</u>	AHRI 550/590
	≥ 75 tons and < 150 tons	<u>≤ 0.720 kW/ton</u> <u>≤ 0.560 IPLV</u>	<u>≤ 0.750 kW/ton</u> <u>≤ 0.490 IPLV</u>	
	≥ 150 tons and < 300 tons	<u>≤ 0.660 kW/ton</u> <u>≤ 0.540 IPLV</u>	<u>≤ 0.680 kW/ton</u> <u>≤ 0.440 IPLV</u>	
	≥ 300 tons <u>and &lt; 600 tons</u>	<u>≤ 0.610 kW/ton</u> <u>≤ 0.520 IPLV</u>	<u>≤ 0.625 kW/ton</u> <u>≤ 0.410 IPLV</u>	
	<u>&gt; 600 tons</u>	<u>≤ 0.560 kW/ton</u> <u>≤ 0.500 IPLV</u>	<u>≤ 0.585 kW/ton</u> <u>≤ 0.380 IPLV</u>	
Water Cooled, Electrically Operated, Centrifugal	< 150 Tons	<u>≤ 0.610 kW/ton</u> <u>≤ 0.550 IPLV</u>	<u>≤ 0.695 kW/ton</u> <u>≤ 0.440 IPLV</u>	AHRI 550/590
	≥ 150 tons and < 300 tons	<u>≤ 0.610 kW/ton</u> <u>≤ 0.550 IPLV</u>	<u>≤ 0.635 kW/ton</u> <u>≤ 0.400 IPLV</u>	
	≥ 300 tons and <u>&lt; 400 tons</u>	<u>≤ 0.560 kW/ton</u> <u>≤ 0.520 IPLV</u>	<u>≤ 0.595 kW/ton</u> <u>≤ 0.390 IPLV</u>	
	<u>≥ 400 tons</u> and < 600 tons	<u>≤ 0.560 kW/ton</u> <u>≤ 0.500 IPLV</u>	<u>≤ 0.585 kW/ton</u> <u>≤ 0.380 IPLV</u>	
	≥ 600 Tons	<u>≤ 0.560 kW/ton</u> <u>≤ 0.500 IPLV</u>	<u>≤ 0.585 kW/ton</u> <u>≤ 0.380 IPLV</u>	

Equipment Type	Size Category	Path A Efficiency <sup>a,b</sup>	Path B Efficiency <sup>a,b</sup>	Test Procedure <sup>c</sup>
Air Cooled Absorption, Single Effect	All Capacities	$\geq 0.600$ COP	N.A. <sup>d</sup>	ANSI/AHRI 560
Water Cooled Absorption, Single Effect	All Capacities	$\geq 0.700$ COP	N.A. <sup>d</sup>	
Absorption Double Effect, Indirect-Fired	All Capacities	$\geq 1.000$ COP $\geq 1.050$ IPLV	N.A. <sup>d</sup>	
Absorption Double Effect, Direct-Fired	All Capacities	$\geq 1.000$ COP $\geq 1.000$ IPLV	N.A. <sup>d</sup>	
Water Cooled Gas Engine Driven Chiller	All Capacities	$\geq 1.2$ COP $\geq 2.0$ IPLV	N.A. <sup>d</sup>	ANSI Z21.40.4A
<p><sup>a</sup> No requirements for:</p> <ul style="list-style-type: none"> <li>Centrifugal chillers with design leaving-evaporator temperature <math>&lt; 36^{\circ}\text{F}</math>; or</li> <li>Positive displacement chillers with design leaving fluid temperature <math>\leq 32^{\circ}\text{F}</math>; or</li> <li>Absorption chillers with design leaving-fluid temperature <math>&lt; 40^{\circ}\text{F}</math></li> </ul> <p><sup>b</sup> Must meet the minimum requirements of Path A or Path B. However, both the full load (COP) and IPLV must be met to fulfill the requirements of the applicable Path.</p> <p><sup>c</sup> See Section 100.1 for definitions</p> <p><sup>d</sup> NA means not applicable</p>				

**TABLE 110.2-E PACKAGED TERMINAL AIR CONDITIONERS AND PACKAGED TERMINAL HEAT PUMPS –  
MINIMUM EFFICIENCY REQUIREMENTS**

<b>Equipment Type</b>	<b>Size Category (Input)</b>	<b>Subcategory or Rating Condition</b>	<b>Efficiency</b>	<b>Test Procedure <sup>c</sup></b>
PTAC (Cooling mode) Newly constructed or newly conditioned buildings or additions	All Capacities	95°F db Outdoor Air	<u>14.0 - (0.300 x Cap/1000)<sup>a</sup> EER</u>	ANSI/AHRI/CSA 310/380
PTAC (Cooling mode) Replacements <sup>b</sup>	All Capacities	95°F db Outdoor Air	10.9 - (0.213 x Cap/1000) <sup>a</sup> EER	
PTHP (Cooling mode) Newly constructed or newly conditioned buildings or additions	All Capacities	95°F db Outdoor Air	14.0 - (0.300 x Cap/1000) <sup>a</sup> EER	
PTHP (Cooling mode) Replacements <sup>b</sup>	All Capacities	95°F db Outdoor Air	10.8 - (0.213 x Cap/1000) <sup>a</sup> EER	
PTHP (Heating Mode) Newly constructed or newly conditioned buildings or additions	All Capacities	-	3.7 - (0.052 x Cap/1000) <sup>a</sup> COP	
PTHP (Heating mode) Replacements <sup>b</sup>	All Capacities	-	2.9 - (0.026 x Cap/1000) <sup>a</sup> COP	

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Efficiency	Test Procedure <sup>c</sup>
SPVAC (Cooling Mode)	<65,000 Btu/h	95°F db / 75°F wb Outdoor Air	<a href="#">10.0 EER</a>	ANSI/AHRI 390
	≥65,000 Btu/h and <135,000 Btu/h	95°F db / 75°F wb Outdoor Air	<a href="#">10.0 EER</a>	
	≥135,000 Btu/h and <240,000 Btu/h	95°F db / 75°F wb Outdoor Air	<a href="#">10.0 EER</a>	
SPVHP (Cooling Mode)	<65,000 Btu/h	95°F db / 75°F wb Outdoor Air	<a href="#">10.0 EER</a>	
	≥65,000 Btu/h and <135,000 Btu/h	95°F db / 75°F wb Outdoor Air	<a href="#">10.0 EER</a>	
	≥135,000 Btu/h and <240,000 Btu/h	95°F db / 75°F wb Outdoor Air	<a href="#">10.0 EER</a>	
SPVHP (Heating Mode)	<65,000 Btu/h	47°F db / 43°F wb Outdoor Air	3.0 COP	
	≥65,000 Btu/h and <135,000 Btu/h	47°F db / 43°F wb Outdoor Air	3.0 COP	
	≥135,000 Btu/h and <240,000 Btu/h	47°F db / 43°F wb Outdoor Air	<a href="#">3.0 COP</a>	
<a href="#">SPVAC (Cooling Mode), nonweatherized space constrained</a>	<a href="#">≤30,000 Btu/h</a>	<a href="#">95°F db / 75°F wb Outdoor Air</a>	<a href="#">9.2 EER</a>	
	<a href="#">≥30,000 Btu/h and &lt;36,000 Btu/h</a>	<a href="#">95°F db / 75°F wb Outdoor Air</a>	<a href="#">9.2 EER</a>	
<a href="#">SPVHP (Cooling Mode), nonweatherized space constrained</a>	<a href="#">≤30,000 Btu/h</a>	<a href="#">95°F db / 75°F wb Outdoor Air</a>	<a href="#">9.2 EER</a>	
	<a href="#">≥30,000 Btu/h and &lt;36,000 Btu/h</a>	<a href="#">95°F db / 75°F wb Outdoor Air</a>	<a href="#">9.2 EER</a>	
<a href="#">SPVHP (Heating Mode), nonweatherized space constrained</a>	<a href="#">≤30,000 Btu/h</a>	<a href="#">47°F db / 43°F wb Outdoor Air</a>	<a href="#">3.0 COP</a>	
	<a href="#">≥30,000 Btu/h and &lt;36,000 Btu/h</a>	<a href="#">47°F db / 43°F wb Outdoor Air</a>	<a href="#">3.0 COP</a>	

*TABLE 110.2-F HEAT TRANSFER EQUIPMENT*

<b>Equipment Type</b>	<b>Subcategory</b>	<b>Minimum Efficiency<sup>a</sup></b>	<b>Test Procedure <sup>b</sup></b>
Liquid-to-liquid heat exchangers	Plate type	NR	ANSI/AHRI 400

<sup>a</sup> NR = no requirement

<sup>b</sup> Applicable test procedure and reference year are provided under the definitions



TABLE 110.2-G PERFORMANCE REQUIREMENTS FOR HEAT REJECTION EQUIPMENT

Equipment Type	Total System Heat Rejection Capacity at Rated Conditions	Subcategory or Rating Condition	Performance Required <sup>a, b, c, d</sup>	Test Procedure <sup>e</sup>
Propeller or axial fan Open-circuit cooling towers	All	95°F entering water 85°F leaving water 75 °F entering air wb	≈42.1 gpm/hp	CTI ATC-105 and CTI STD-201
Centrifugal fan Open-circuit cooling towers	All	95°F entering water 85°F leaving water 75 °F entering air wb	≈ 20.0 gpm/hp	CTI ATC-105 and CTI STD-201
Propeller or axial fan closed-circuit cooling towers	All	102°F entering water 90°F leaving water 75 °F entering air wb	≈ 14.0 gpm/hp	CTI ATC-105S and CTI STD-201
Centrifugal fan closed-circuit cooling towers	All	102°F entering water 90°F leaving water 75 °F entering air wb	≈ 7.0 gpm/hp	CTI ATC-105S and CTI STD-201
<u>Propeller or axial fan evaporative condensers</u>	<u>All</u>	<u>R-507A test fluid</u> <u>165°F entering gas temperature</u> <u>105°F condensing temperature</u> <u>75°F entering wetbulb</u>	<u>≥ 157,000 Btu/h-hp</u>	<u>CTI ATC-106</u>
<u>Propeller or axial fan evaporative condensers</u>	<u>All</u>	<u>Ammonia test fluid</u> <u>140°F entering gas temperature</u> <u>96.3°F condensing temperature</u> <u>75°F entering wetbulb</u>	<u>≥ 134,000 Btu/h-hp</u>	<u>CTI ATC-106</u>
<u>Centrifugal fan evaporative condensers</u>	<u>All</u>	<u>R-507A test fluid</u> <u>165°F entering gas temperature</u> <u>105°F condensing temperature</u> <u>75°F entering wetbulb</u>	<u>≥ 135,000 Btu/h-hp</u>	<u>CTI ATC-106</u>
<u>Centrifugal fan evaporative condensers</u>	<u>All</u>	<u>Ammonia test fluid</u> <u>140°F entering gas temperature</u> <u>96.3°F condensing temperature</u> <u>75°F entering wetbulb</u>	<u>≥ 110,000 Btu/h-hp</u>	<u>CTI ATC-106</u>
<u>Air cooled condensers</u>	<u>All</u>	<u>R22 test fluid</u> <u>125°F condensing temperature</u> <u>190°F entering gas temperature</u> <u>15°F subcooling</u> <u>95°F entering drybulb</u>	<u>≥ 176,000 Btu/h-hp</u>	<u>ANSI/AHRI 460</u>

<sup>a</sup> For purposes of this table, open-circuit cooling tower performance is defined as the water flow rating of the tower at the given rated conditions divided by the fan motor nameplate power.

<sup>b</sup> For purposes of this table, closed-circuit cooling tower performance is defined as the process water flow rating of the tower at the given rated conditions divided by the sum of the fan motor nameplate rated power and the integral spray pump motor nameplate power .

<sup>c</sup> For purposes of this table air-cooled condenser performance is defined as the heat rejected from the refrigerant divided by the fan motor nameplate power.

<sup>d</sup> Open cooling towers shall be tested using the test procedures in CTI ATC-105. Performance of factory assembled open cooling towers shall be either certified as base models as specified in CTI STD-201 or verified by testing in the field by a CTI approved testing agency. Open factory assembled cooling towers with custom options added to a CTI certified base model for the purpose of safe maintenance or to reduce environmental or noise impact shall be rated at 90 percent of the CTI certified performance of the associated base model or at the manufacturer’s stated performance, whichever is less. Base models of open factory assembled cooling towers are open cooling towers configured in exact accordance with the Data of Record submitted to CTI as specified by CTI STD-201. There are no certification requirements for field erected cooling towers.

<sup>e</sup> Applicable test procedure and reference year are provided under the definitions.

*TABLE 110.2-H Electrically Operated Variable Refrigerant Flow (VRF) Air Conditioners  
Minimum Efficiency Requirements*

<b>Equipment Type</b>	<b>Size Category</b>	<b>Heating Section Type</b>	<b>Sub-Category or Rating Condition</b>	<b>Minimum Efficiency</b>	<b>Test Procedure<sup>a</sup></b>
VRF Air Conditioners, Air Cooled	<65,000 Btu/h	All	VRF Multi-split System	13.0 SEER	ANSI/AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	11.2 EER 13.1 IEER <sup>b</sup>	
	≥135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	11.0 EER 12.9 IEER <sup>b</sup>	
	≥240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	10.0 EER 11.6 IEER <sup>b</sup>	
<sup>a</sup> Applicable test procedure and reference year are provided under the definitions. <sup>b</sup> IEERs are only applicable to equipment with capacity control as per ANSI/AHRI 1230 test procedures.					

*TABLE 110.2-1 Electrically Operated Variable Refrigerant Flow Air-to-Air and Applied Heat Pumps - Minimum Efficiency Requirements*

<b>Equipment Type</b>	<b>Size Category</b>	<b>Heating Section Type</b>	<b>Sub-Category or Rating Condition</b>	<b>Minimum Efficiency</b>	<b>Test Procedure <sup>b</sup></b>
VRF Air Cooled, (cooling mode)	<65,000 Btu/h	All	VRF Multi-split System	13.0 SEER	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System <sup>a</sup>	11.0 EER 12.9 IEER <sup>c</sup>	
	≥135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System <sup>a</sup>	10.6 EER 12.3 IEER <sup>c</sup>	
	≥240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System <sup>a</sup>	9.5 EER 11.0 IEER <sup>c</sup>	
VRF Water source (cooling mode)	<65,000 Btu/h	All	VRF Multi-split systems <sup>a</sup> 86°F entering water	12.0 EER	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h	All	VRF Multi-split System <sup>a</sup> 86°F entering water	12.0 EER	
	≥135,000 Btu/h	All	VRF Multi-split System <sup>a</sup> 86°F entering water	10.0 EER	
VRF Groundwater source (cooling mode)	<135,000 Btu/h	All	VRF Multi-split System 59°F entering water	16.2 EER	AHRI 1230
	≥135,000 Btu/h	All	VRF Multi-split System <sup>a</sup> 59°F entering water	13.8 EER	
VRF Ground source (cooling mode)	<135,000 Btu/h	All	VRF Multi-split System <sup>a</sup> 77°F entering water	13.4 EER	AHRI 1230
	≥135,000 Btu/h	All	VRF Multi-split System <sup>a</sup> 77°F entering water	11.0 EER	

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure <sup>b</sup>
VRF Air Cooled (heating mode)	<65,000 Btu/h (cooling capacity)	---	VRF Multi-split System	7.7 HSPF	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h (cooling capacity)	---	VRF Multi-split system 47°F db/ 43°F wb outdoor air	3.3 COP	
			VRF Multi-split system 17°F db/15°F wb outdoor air	2.25 COP	
	≥135,000 Btu/h (cooling capacity)	---	VRF Multi-split system 47°F db/ 43°F wb outdoor air	3.2 COP	
			VRF Multi-split system 17°F db/15°F wb outdoor air	2.05 COP	
VRF Water source (heating mode)	<135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 68°F entering water	4.2 COP	AHRI 1230
	≥135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 68°F entering water	3.9 COP	
VRF Groundwater source (heating mode)	<135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 50°F entering water	3.6 COP	AHRI 1230
	≥135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 50°F entering water	3.3 COP	
VRF Ground source (heating mode)	<135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 32°F entering water	3.1 COP	AHRI 1230
	≥135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 32°F entering water	2.8 COP	

<sup>a</sup> Deduct 0.2 from the required EERs and IEERs for Variable Refrigerant Flow (VRF) Multi-split system units with a heating recovery section.

<sup>b</sup> Applicable test procedure and reference year are provided under the definitions.

<sup>c</sup> IEERs are only applicable to equipment with capacity control as per ANSI/AHRI 1230 test procedures.

TABLE 110.2-J Warm-Air Furnaces and Combination Warm-Air Furnaces/Air-Conditioning Units, Warm-Air Duct Furnaces, and Unit Heaters

Equipment Type	Size Category (Input)	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure <sup>a</sup>
Warm-Air Furnace, Gas-Fired	< 225,000 Btu/h	Maximum Capacity <sup>b</sup>	78% AFUE or 80% E <sub>t</sub>	DOE 10 CFR Part 430 or Section 2.39, Thermal Efficiency, ANSI Z21.47
	≥ 225,000 Btu/h	Maximum Capacity <sup>b</sup>	80% E <sub>t</sub>	Section 2.39, Thermal Efficiency, ANSI Z21.47
Warm-Air Furnace, oil-Fired	< 225,000 Btu/h	Maximum Capacity <sup>b</sup>	78% AFUE or 80% E <sub>t</sub>	DOE 10 CFR Part 430 or Section 42, Combustion, UL 727
	≥ 225,000 Btu/h	Maximum Capacity <sup>b</sup>	81% E <sub>t</sub>	Section 42, Combustion, UL 727
Warm-Air Duct Furnaces, Gas-Fired	All Capacities	Maximum Capacity <sup>b</sup>	80% E <sub>c</sub>	Section 2.10, Efficiency, ANSI Z83.8
Warm-Air Unit Heaters, Gas-Fired	All Capacities	Maximum Capacity <sup>b</sup>	80% E <sub>c</sub>	Section 2.10, Efficiency, ANSI Z83.8
Warm-Air Unit Heaters, Oil-Fired	All Capacities	Maximum Capacity <sup>b</sup>	<u>81% E<sub>c</sub></u>	Section 40, Combustion, UL 731

<sup>a</sup> Applicable test procedure and reference year are provided under the definitions.

<sup>b</sup> Compliance of multiple firing rate units shall be at maximum firing rate.

<sup>c</sup> Combustion units not covered by NAECA (3-phase power or cooling capacity greater than or equal to 19 kW) may comply with either rating.

<sup>d</sup> E<sub>t</sub>= thermal efficiency. Units must also include an interrupted or intermittent ignition device (IID), have jacket losses not exceeding 0.75% of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

<sup>e</sup> E<sub>c</sub>= combustion efficiency (100% less flue losses). See test procedure for detailed discussion.

<sup>f</sup> As of August 8, 2008, according to the Energy Policy Act of 2005, units must also include interrupted or intermittent ignition device (IID) and have either power venting or an automatic flue damper.

TABLE 110.2-K Gas- and Oil-Fired Boilers, Minimum Efficiency requirements

Equipment Type	Sub Category	Size Category (Input)	Minimum Efficiency <sup>b,c</sup>		Test Procedure <sup>a</sup>
			Before 3/2/2022	After 3/1/2022	
Boiler, hot water	Gas-Fired	< 300,000 Btu/h	82% AFUE	82% AFUE	DOE 10 CFR Part 430
		≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h <sup>d</sup>	80% E <sub>t</sub>	80% E <sub>t</sub>	DOE 10 CFR Part 431
		> 2,500,000 Btu/h <sup>e</sup>	82% E <sub>c</sub>	82% E <sub>c</sub>	
	Oil-Fired	< 300,000 Btu/h	84% AFUE	84% AFUE	DOE 10 CFR Part 430
		≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h <sup>d</sup>	82% E <sub>t</sub>	82% E <sub>t</sub>	DOE 10 CFR Part 431
		> 2,500,000 Btu/h <sup>e</sup>	84% E <sub>c</sub>	84% E <sub>c</sub>	
Boiler, steam	Gas-Fired	< 300,000 Btu/h	80% AFUE	80% AFUE	DOE 10 CFR Part 430
	Gas-Fired all, except natural draft	≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h <sup>d</sup>	79% E <sub>t</sub>	79% E <sub>t</sub>	DOE 10 CFR Part 431
		> 2,500,000 Btu/h <sup>e</sup>	79% E <sub>t</sub>	79% E <sub>t</sub>	DOE 10 CFR Part 431
	Gas-Fired, natural draft	≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h <sup>d</sup>	77% E <sub>t</sub>	79% E <sub>t</sub>	DOE 10 CFR Part 431
		> 2,500,000 Btu/h <sup>e</sup>	77% E <sub>t</sub>	79% E <sub>t</sub>	DOE 10 CFR Part 431
	Oil-Fired	< 300,000 Btu/h	82% AFUE	82% AFUE	DOE 10 CFR Part 430
		≥ 300,000 Btu/h and ≤ 2,500,000 Btu/h <sup>d</sup>	81% E <sub>t</sub>	81% E <sub>t</sub>	DOE 10 CFR Part 431
		> 2,500,000 Btu/h <sup>e</sup>	81% E <sub>t</sub>	81% E <sub>t</sub>	DOE 10 CFR Part 431